

REMARKS

Upon entry of the present amendment, claims 1-15 are pending in the application, of which claims 1, 5, 9, 10, and 14-15 are independent. The applicant gratefully acknowledges the Examiner's indication that claims 10, 14, and 15 contain allowable subject matter.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment is submitted. The applicant contends that by the present amendment, all bases of rejection set forth in the Office Action have been traversed and overcome. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

Claim rejections – 35 USC 103

In the above-identified Office Action, the Examiner rejected claims 1-8 under 35 USC 103(a) as unpatentable over Atkin et al (WO 91/16530) in view of Stewart (3748925). In his rejection, the Examiner stated that Atkin discloses a crankshaft 1 with helical gears 15, but does not show split crank webs, and that Stewart teaches split crank webs welded onto the crankshaft, which are considered to be removable, albeit with difficulty. The Examiner states that, in his view, it would have been obvious to use split webs in Atkin for easier manufacturing in view of Stewart.

The applicant respectfully disagrees with and traverses this ground of rejection, since Atkins and Stewart, considered either together or separately, fail to teach, disclose, or suggest applicant's claimed structure in which one of the crank webs forms a primary drive gear and another one of the crank webs comprises a split crank web which is connected to the primary drive gear via a crankpin.

The Standard for Obviousness under Federal Circuit Law

Applicant respectfully wishes to call the Examiner's attention to some relevant cases of the U.S. Court of Appeals for the Federal Circuit (CAFC). The CAFC was established in 1982 to bring national standards, and a certain level of conformity and continuity to Federal patent case law. Decisions of the Federal Circuit are relevant and helpful in giving guidance to private patent practitioners, as well as to the personnel of the U.S. Patent and Trademark Office.

The U.S. Court of Appeals for the Federal Circuit has said that a reference must be viewed in its entirety, *Gore v. Garlock*, 220 U.S.P.Q. 303 (CAFC 1983) and that it is impermissible to use the claims as a frame, and the references as a mosaic, to pick and choose selected pieces, out of context, to reconstruct the invention, *Northern Telecom v. Datapoint*, 908 F.2d 931 (CAFC 1990).

The U.S. Court of Appeals for the Federal Circuit has also said that in order to combine references, the Examiner must show some motivation, suggestion, or teaching of the desirability of making the combination, *In re Dembicza*k, 50 USPQ 2d 1614, 1617 (CAFC 1999); and that the use of hindsight, in evaluating patentability, is improper, *In re Werner Kotzab*, 55 U.S.P.Q. 2d 1313 (CAFC 2000); *Gore v. Garlock, supra*.

Specifically, in *Kotzab*, supra, the CAFC stated:

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See *Dembiczak*, 175 F.3d at 999, 50 USPQ2d at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher." *Id.*

Most, if not all inventions arise from a combination of old

elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See id. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See id. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant (citations omitted).

Applicant respectfully suggests that the Examiner appears to be evaluating applicant's invention using improper hindsight, picking and choosing selected portions of the references and combining those selected portions to reconstruct a mosaic of applicant's invention. Applicant respectfully suggests that such an approach is not consistent with the standards set out in the above-quoted cases of the CAFC.

The applicant further maintains that the disclosure of Atkins, as modified by the teaching of Stewart, fails to make the applicant's invention obvious. Stewart discloses a method of assembling a crankshaft, beginning with a crankshaft base having stub web portions to which balance weights are fixed by welding. The weights disclosed by Stewart are generally C-shaped, and are secured along a flattened peripheral edge portion of the web, using an electron beam welding process. The welding process causes fusion of the metals of the crankshaft and weight so that these components are united (Stewart, col. 3, lines 25-32). The applicant respectfully asserts that the crank webs disclosed by Stewart are not "split" once the metals of the components are fused together. Thus, Stewart discloses weights added during the manufacturing process of the crankshaft so as to be permanently fixed to the crankshaft by fusion, and thus are integral therewith.

Further, applicant respectfully submits that even if the cited references are hypothetically combined, for the sake of argument, the combination fails to produce applicant's claimed invention.

**Teaching Away**

The Court of Appeals for the Federal Circuit has established that a *prima facie* case of obviousness can be rebutted if the applicant . . . can show 'that the art in any material respect taught away' from the claimed invention." *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (CAFC 1997). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1360, 52 USPQ2d 1298 (CAFC 1999), *In re Haruna*, 249 F.3d 1327; 58 U.S.P.Q.2D 1517 (CAFC 2001).

In the present application, by teaching away from applicant's claimed structure, Stewart's clear preference for welding the balance weights on to the crankshaft body, and fusing the metal of the two components together, as noted, provides evidence of non-obviousness of applicant's claimed invention.

As regards claim 1, and as discussed above, Atkins does not disclose a helical gear, and the invention of Atkins as modified by Stewart does not disclose or suggest crank webs which are split. Therefore, the applicant considers claim 1 to be in condition for allowance.

As regards claim 2, Atkins is silent as to the manner in which the disclosed bevel gear is formed on the crank web.

As regards claims 3 and 4, the applicant disagrees with and traverses this rejection, since Atkins, as modified by Stewart, does not disclose or suggest a supplemental crank web which is removable from the main crank web, as recited in the claim. In fact, Stewart teaches away from

removability of the weights, as seen by the permanency of the welding process and as noted in the background section, where the importance of maintaining the balance weights firmly attached to the crankshaft is discussed.

As regards claim 5, the applicant's invention is clearly distinct from the disclosure of Atkins as modified by Stewart. In addition, Claim 5 has been amended herein to more clearly recite the features which patentably distinguish the applicant's invention from the prior art. Specifically, claim 5 has been amended to recite that the first and second balance weights are mounted to the crankshaft body in a selectively detachable manner. This feature is not suggested or disclosed by Atkins, Stewart, or the combination thereof.

Also in the above-identified Office Action, the Examiner rejected claims 1-9 and 11-13 under 35 USC 103(a) as unpatentable over Atkin et al (WO 91/16530) in view of Mitsubishi (JP 58-91917). The Examiner stated that Atkin discloses a crankshaft 1 with helical gears 15, but does not show split crank webs. The Examiner further states that Mitsubishi discloses split webs with removable weights, and that it would be obvious to split the webs of Atkin for flexible balancing in view of Mitsubishi.

The applicant respectfully disagrees with and traverses this rejection, since Atkins does not disclose a helical gear, but instead discloses a herringbone bevel gear. As discussed above, this assertion is supported on page 2, line 16-18, and on page 4, lines 16-29, which describe the drive gears as being "inclined to the axis of the crankshaft" so as to center the driven gears on quill shaft 4 between stops 12. Thus Atkins does not disclose a helical gear formed on crank web, and further does not disclose a split crank web or crank web divided into two parts, as recited in claims 1 and 9.

The applicant further submits that the disclosure of Atkins, as modified by the teaching of

Mitsuishi, fails to makes the applicant's invention obvious. Although Mitsuishi discloses a crank web which includes a detachable weight fitted to a peripheral edge of the crank web, Mitsuishi does not disclose or suggest a helical gear formed on the crankshaft. Thus, the applicant submits that the disclosure of Mitsuishi is not sufficient to correct the deficiencies of the Atkins reference with respect to the rejections of claims 1 and 9, and therefore claims 1 and 9, and the claims which depend from them, are considered to be in condition for allowance.

Further, there are clear advantages provided by applicant's provision of the split crank web and the helical gear, which advantages are not taught or suggested by the references. As noted paragraph [056] of applicant's specification, applicant's modular design allows for the teeth of the helical gear to be machined into the crankshaft with the balance weight removed, allowing for easier and more convenient manufacture. Further, with applicant's modular design, a single crankshaft body may be used as a component of engines of different sizes, by using smaller or larger balance weights thereon.

As regards claim 5, the applicant disagrees with this rejection since Atkins, as modified by Mitsuishi, does not suggest the configuration in which the gear is formed on one side of a crankpin, and the split web is formed on the opposed side of the crankpin, as recited in this claim. This configuration is advantageous, since gear teeth can be formed on the gear outer surface prior to attachment of the weight to the adjacent web, ensuring sufficient access to the web for the gear teeth forming operation.

However, in order to expedite the prosecution of this application, the applicant has amended claim 5 herein to recite that the second crank web is situated between the first balance weight and the gear. This feature is not disclosed by Mitsuishi, who shows a U-shaped weight body fixed to a peripheral edge face of the crank web.

As regards claim 8, the applicant respectfully disagrees with this rejection since a helical gear is not disclosed or suggested by Atkins, Mitsuishi, or their combination.

As regards claim 13, the applicant respectfully disagrees with this rejection since Mitsuishi discloses a single fastener to secure the balance weight 10 to the crank web 3. As shown in FIG. 3, Mitsuishi discloses a single bolt 4 extending through holes 12 formed in either end of the U-shaped weight body 10. Thus, since Mitsuishi does not disclose or suggest a plurality of fasteners to attach the supplemental balance weight to the weight mounting portion, claim 13 distinguishes over Mitsuishi.

**Allowable Subject Matter**

Further in the above-identified office action, the Examiner objected to Claims 10, 14, and 15 as dependent upon a rejected base claim, but indicated that these claims would be allowable if made independent. Per the Examiner's suggestion, these claims have been rewritten in independent form to include all the limitations of the base claim and any intervening claims.

Amended claims 10, 14, and 15 are now in condition for allowance.

**Conclusion**

Based on the foregoing, applicant respectfully submits that all of the objections and rejections set forth in the Office Action have been overcome by the present amendment, and that as presently amended, all of the pending claims are believed to be allowable over all of the references of record, whether considered singly or in combination.

Applicant requests reconsideration and withdrawal of the rejection of record, and allowance of the pending claims.

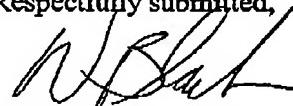
If the Examiner is not fully convinced of all of the claims now in the application, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

The Commissioner is hereby authorized to charge \$ 600.00 for three independent claims in excess of three, to Deposit Account 50-0744 in the name of Carrier, Blackman & Associates, P.C.

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Favorable consideration is respectfully requested.

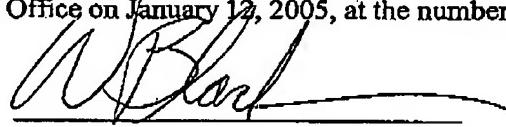
Respectfully submitted,

  
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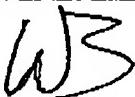
  
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Applicant requests reconsideration and withdrawal of the rejection of record, and allowance of the pending claims.

If the Examiner is not fully convinced of all of the claims now in the application, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

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